

11.0 Methods for Collecting, Analyzing, and Reporting Water Quality and Sediment Chemical Data

11.1 FIELD EQUIPMENT AND PREPARATION PROCEDURES

11.1.1 Field Equipment List

Compiling a list of required field equipment for every individual water quality survey is not practical. Field conditions, monitoring objectives, and the scope and intensity of surveys varies so widely that advanced planning and preparation are often necessary to define the equipment that will be needed to collect samples for water quality surveys.

Equipment may be characterized as "general sampling" or "specialized sampling" equipment. "General sampling" equipment might be considered as equipment that would be needed no matter what the circumstances of the planned survey. Special equipment may or may not be required. Once the objectives of a survey have been defined and knowledge of field conditions has been obtained, the appropriate equipment can be identified and prepared.

General sampling equipment includes:

- Vehicle (car, pickup truck, or 4-wheel drive depending on field and weather conditions)
- Sample bottles (250ml or 1-l polyethylene bottles with caps)
- Preservative ampules (nitric acid for metals, sulfuric acid for nutrients, sized for 250ml or 1L bottles)
- Waste vessel (jar or ziplock) for used ampules
- Hip boots
- Rubber gloves
- Coolers (with ice or ice packs)
- Notebook for field notes
- Pens, pencils and waterproof marking pens
- Camera and film
- Maps
- Field tote or 5-gallon bucket
- Flashlight and spare batteries
- Multi meter (pH, DO, Conductivity, Temperature)
- Hand-held GPS unit

Special equipment is categorized by objective:

Flow measurements:

- Marsh- McBirney Portable Current Meter
- Wading rod for current meter
- Tape measure
- Flow data sheet s
- Calibrated 5-gallon plastic bucket
- Stop watch
- Clipboard
- Wooden Stakes or re-bar and hammer
 - Key for gaging stations
- Carpenter's chalk
- Yardstick or calibrated rod for measuring weir depth
- Water measurement manual (tables for weirs, flumes, etc.)

Filtering:

- Filter holders with filter and prefilter
- Sample bottles
- Syringes
- Collection bottles (500ml, polyethylene)

pH Measurement:

- pH meter
- pH standards 4.0, 7.0, and 9.0
- Squeeze bottle with deionized water
- Plastic beakers

Dissolved Oxygen (DO) Measurement:

- DO meter (YSI model 52A with probe)
- Winkler field kit (check reagents)
- 300ml BOD bottles
- Thermometers
- Mercury barometers

TSS sample collection:

- DH-48 or other depth-integrating sampling devices
- Pint glass bottles (cleaned and rinsed with distilled water)
- Funnel
- Tape measure

Biological sampling:

- Sterile thiosulfate-treated bottles for coliforms
- Hess sampler, scrub brush and metal rod (benthic macroinvertebrates)
- D-net (benthic macroinvertebrates)
- 500ml or 1 Liter wide-mouth plastic jars for benthic samples
- Forceps
- Ethanol
- Formalin
- Brushes
- Squeeze bottle
- Periphyton jars
- Scraper (spoon, knife, spatula)
- Lugol's solution

Miscellaneous:

- Bucket and rope (for bridge sampling)
- Axe
- Clipboard
- Traffic cones for bridge work
- Data cards
- Chain-of-custody forms and seals for coolers
- Garbage bags
- Money
- Sunscreen
- Bug repellent
- Red pepper spray
- Government employee identification

11.1.2 Sample Container Preparation (Heavy Metals)

Procedures for equipment preparation, field collection, and field analyses shall be consulted before sampling begins to identify equipment needs most appropriate to a survey's objectives and expected field conditions.

A. EQUIPMENT:

1. 250ml polyethylene bottles
2. Preservative ampules

B. REAGENTS: 5% HNO₃

C. PREPARATION:

1. Fill bottles with 5% HNO₃ and cap.
2. Let bottles soak at least 48 hours.
3. Discard acid rinse, and rinse bottles at least three times with DI water.
4. Acid ampules shall be acid washed if contamination is known or suspected. Teflon ampules need to be soaked when new. When reused, only refilling is necessary.

D. PRECAUTIONS: None

E. SPECIAL INSTRUCTIONS:

1. Discard acid rinsate. Do not reuse.
2. Make sure acid-soaked bottles are clearly identified when taken into the field.
3. Procedure is particularly important for carbon-furnace trace metals analysis. Consult with a laboratory on the requirements for Mass Spectrometer/AA analyses.

F. REFERENCES: None

G. PROJECT: Clark Fork Basin Study, NPDES Compliance Monitoring, Intensive Surveys, Drinking Water

11.1.3 Filtration

A. EQUIPMENT:

1. 500ml wide-mouth polyethylene collection bottles (Nalgene or equivalent)
2. Nuclepure or Swin-Lok filter holders
3. 47mm diameter, 0.45um Gelman Supor-450 membrane filters
4. 47mm diameter, Whatman GF/C glass microfibre prefilters
5. 60ml plastic syringes (Charise)
6. 150ml polyethylene sample bottles
7. 100ml polyethylene sample bottles

B. REAGENTS: 3:1 solution HCL

C. PREPARATION:

1. All equipment except filters and sample bottles must be soaked in HCL bath (add HCL to water!) then thoroughly rinsed in DI water.
2. Apparatus that comes into incidental contact with water samples (500ml collection bottles, filter holders, and syringes) requires at least 3-4 hours of acid soaking. All filter holders and syringes shall be disassembled completely before soaking.
3. Sample bottles that shall contain samples for days or weeks must be acid soaked overnight.
4. Rinse all bottles and caps at least three times with DI water.
5. Use a pipette washer to rinse syringes and filter holder components. Load apparatus into the pipette washer. Let washer fill and empty four or five times (approximately 20 minutes).
6. Assemble filter holders according to manufacturers' instructions (use plastic gloves).

D. PRECAUTIONS:

1. Make sure all bottles and other apparatus are filled during the soaking period. Make sure all of the other apparatus comes into complete contact with the acid solution.

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2. Use latex gloves or other hand covering during all aspects of cleaning and during filter assembly to prevent acid burns and contamination of apparatus from skin oils, dirt, etc.

3. Keep the acid bath covered during and after use.

E. SPECIAL INSTRUCTIONS : Change the HCL bath as needed.

F. REFERENCES: None

G. PROJECT: Clark Fork Basin Study, NPDES Compliance
Monitoring, Intensive Surveys